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10/775,986	02/10/2004	John F. Yanus	D/A3066	1319

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RODEE, CHRISTOPHER D	
ART UNIT	PAPER NUMBER
1756	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/775,986	YANUS ET AL.	
	Examiner	Art Unit	
	Christopher RoDee	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-34 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-34 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2/10/04 8/8/05.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 33 and 34 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 33 and 34 do not properly further limit claim 32 because a plurality of layers cannot be a single layer (i.e., cannot be "1"). These claims, therefore, do not properly further limit claim 1.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 5-9, 14-18, 20-22, 24, 29, and 31 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Iwasaki *et al.* in US Patent 5,192,633.

See Examples 7-9 in Table 8, which are based on Example 6.

Claims 1, 2, 4, 6-9, 14, 16-18, 20, 24, 25, and 28 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Mimura *et al.* in US Patent 5,008,173.

See Example 4b.

Claims 1, 3, 5-9, 14-18, 20, 29, and 31 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Grune *et al.* in US Patent 6,017,665.

See Examples 1-4.

Claims 1, 3, 5, 14-18, 20-22, 24, 25, 27, 29, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 1109068.

The EP document discloses a photoconductive imaging member having a conductive support, such as aluminum, (¶ [0071] – [0074], specifically ¶ [0072]), a subbing layer (¶ [0075] – [0076]), a 0.01 to 2 μm thick charge generating layer (¶ [0079] – [0081], and a 10 to 40 μm thick charge transporting layer (¶ [0082] – [0113]). An antioxidant, such as given by the formula (1-4) (see p. 20) is added to the charge transport layer in an amount of from 0.01 to 20 percent by weight (¶ [0120] – [0121]). The imaging member is used in an imaging process as discussed in ¶ [0141]. See the Examples for specific formulations and exemplified layer thicknesses.

Claims 1, 3, 5-9, 15-18, 24, 25, 27, and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 823 668.

The EP document discloses a photosensitive member having a conductive support in either a drum (rigid) or belt (flexible) form (p. 25, l. 40-50), a barrier layer (i.e., a hole blocking layer) of 0.05 to 7 μm thickness, a charge generating layer containing a charge generating compound, such as a metal-free or titanyl phthalocyanine (p. 25, l. 19-34), and a charge transport layer containing a fluorenone compounds and an antioxidant, such as compound HP-3 and HP-11. See Example 1 noting the 0.30 μm thick charge generating layer and the 20 μm thick charge transport layer. This charge transport layer contains 3.4 weight percent of the antioxidant. The photosensitive member is used an imaging apparatus as seen in Figure 1 and

discussed on page 26. The method of using this photosensitive member is also discussed on page 26.

Claims 1-9, 14-18, 27-29, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Mori in US Patent 5,567,557.

Mori discloses an electrophotgraphic photoreceptor which comprises; a conductive substrate, an intermediate layer on the conductive substrate, a photosensitive bilayer of an organic material on the intermediate layer, the photosensitive bilayer includes a charge generation layer and a charge transport layer, the charge generation layer being deposited on the intermediate layer, the charge transport layer being deposited on the charge generation layer, the charge transport layer being an outermost layer of the photosensitive bilayer, and the charge transport layer contains an ester phosphite antioxidant and a hindered phenol antioxidant (col. 4, l. 1-12). The exemplified hindered phenol antioxidant is given by the formula 4-1 or 4-5 (col. 12). The antioxidant is present in an amount of from 0.01 to 10 weight percent (col. 13, l. 20-24; Table 1). Exemplified photoreceptors are present in Embodiment 1 where an aluminum plate is used as the support, the charge generation layer is 0.3 μm thick, and the charge transport layer is 20 μm thick. A method of reproducing images is disclosed in the examples.

Claims 1-9, 14-18, 20, 24, 25, 27-29, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Ueda *et al.* in US Patent 5,380,613.

Ueda discloses a photosensitive member having a laminated structure as shown in Figure 2 in which a photosensitive layer is a function divided type and formed by laminating a charge generating layer (6) containing the photoconductive material (3) on the electrically

conductive substrate (1) and then laminating a charge transporting layer (5) containing the charge transporting material (2) is formed on the charge generating layer (6). Alternatively, a laminated structure as shown in FIG. 3 can be used in which a photosensitive layer is a function divided type and formed by laminating the charge transporting layer (5) containing the charge transporting material (2) on the electrically conductive substrate (1) and then laminating the charge generating layer (6) containing the photoconductive material (3) on the charge transporting layer (5). See column 33, lines 53-column 34, line 57. The charge transport layer contains a hindered phenol given by the formula (14) or (41), among others (cols. 28 & 31). The thickness of the charge generating layer is 4 μm or less, preferably, 2 μm or less, and the charge-transporting layer has a thickness in the range 3-50 μm, preferably 5-30 μm (col. 36, l. 19-22). Titanyl phthalocyanine is disclosed as an effective charge generating compound (col. 37, l. 3). Example 1 shows a photosensitive member with an aluminum drum support, a charge generating layer, and a 20 μm thick charge transport layer having an aryl amine. Example 4 uses a metal-free phthalocyanine as the charge generation material (col. 39) while Example 10 uses a copper phthalocyanine as the charge generation material and compound (41) as the hindered phenol.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-18 and 20-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuh *et al.* in US Patent 6,261,729 in view of Mori in US Patent 5,567,557 and further in view of *Handbook of Imaging Materials*. Diamond, Arthur S & David Weiss (eds.) pp. 145-164.

Yuh discloses an imaging member comprising a substrate, a charge blocking layer, and an imaging layer (Abstract). As seen in Figures 1 and 2 these imaging members are provided with an anti-curl layer **1**, a supporting substrate **2**, an electrically conductive ground plane **3**, a charge blocking layer **4**, an adhesive layer **5**, a charge generating layer **6**, a charge transport layer **7**, an overcoating layer **8**, and a ground strip **9** (col. 3, l. 38-47). Useful supporting substrates include those composed of aluminum, polyesters, polycarbonates, polyurethanes, or polyamides (col. 4, l. 45-col. 5, l. 17). The electrically conductive ground plane is present when the substrate is not conductive. This ground plane is a metal such as aluminum or titanium (col. 5, l. 62 - col. 6, l. 32). The substrate maybe rigid or flexible (col. 4, l. 60).

The charge blocking layer is disclosed as a hole blocking layer (col. 6, l. 41-45). This layer contains a phenolic binder having units of a first, second, and third type as depicted in column 7 as well as n-type particles (col. 10, l. 53-59). Preferred n-type particles include titanium dioxide (col. 10, l. 56; col. 11, l. 40-44; Example I), which may be treated with other oxides such as silica (col. 11, l. 65 - col. 12, l. 3). The blocking layer has a thickness of from about 0.0.1 to about 10 microns (col. 10, l. 1-4). Preferred phenolic polymers include VARCUM 29112 (Example I), which is a formaldehyde polymer of ammonia, cresol, and phenol (spec. p. 16, l. 20-21), and DURITE 97 (Example II), which is a formaldehyde polymer of phenol, p-tert-butylphenol, and cresol (spec. p. 16, l. 17-19).

The charge generating layer of the imaging member contains a charge generating pigment, such as a phthalocyanine. Copper phthalocyanine. alumino-chloro phthalocyanine, and hydroxy gallium phthalocyanine are specifically disclosed (col. 13, l. 54 - col. 14, l. 13). This

layer has a thickness of from about 0.1 to about 10 microns (col. 14, l. 58-65) and contains about 30 to about 90 weight percent phthalocyanine pigments (col. 14, l. 20-47) and the remainder a binder, such as polycarbonates, polyesters, and polyvinylacetals, among others (col. 14, l. 14-19). The charge transporting layer contains a charge transport compound, such as N,N'-diphenyl-N,N'-bis(alkylphenyl)-(1,1'-biphenyl)-4,4'-diamine wherein alkyl is selected from the group consisting of methyl, ethyl, propyl, butyl, or hexyl (col. 15, l. 9-42; Example I). The artisan would recognize this compound as a hole transport material. The adhesive layer contains a polyester adhesive with a Mw of from about 50,000 to about 100,000, and preferably about 70,000, and a Mn of preferably about 35,000 (col. 13, l. 25-53).

Yuh does not disclose the hindered phenol antioxidant of the instant claims, but Mori discloses an electrophotgraphic photoreceptor which comprises; a conductive substrate, an intermediate layer on the conductive substrate, a photosensitive bilayer of an organic material on the intermediate layer, the photosensitive bilayer includes a charge generation layer and a charge transport layer, the charge generation layer being deposited on the intermediate layer, the charge transport layer being deposited on the charge generation layer, the charge transport layer being an outermost layer of the photosensitive bilayer, and the charge transport layer contains an ester phosphite antioxidant and a hindered phenol antioxidant (col. 4, l. 1-12). The exemplified hindered phenol antioxidant is given by the formula 4-1 or 4-5 (col. 12). The antioxidant is present in an amount of from 0.01 to 10 weight percent (col. 13, l. 20-24; Table 1). The combination of antioxidants in the charge transport layer permits the artisan to control degradation of the photoreceptor from active gasses, such as ozone, during the copying process.

Diamond reviews the basic steps of the electrophotographic copying process. This process includes a charging step (§ 4.2.1), which Diamond identifies as producing nitrogen oxides and ozone as byproducts, which have deleterious effects on the photoreceptor.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add an ester phosphite antioxidant and a hindered phenol antioxidant to the charge transport layer of Yuh because these compounds reduce the deleterious effects of ozone and other gaseous by-products formed during the photoreceptor charging process, as noted by Diamond. The artisan would have found it obvious to optimize the amounts of the antioxidants in order to minimize the deleterious effects of ozone during charging.

Although Yuh does not disclose Type V hydroxygallium phthalocyanine, the specification acknowledges that this form of hydroxygallium phthalocyanine is well known in the art (see spec. pp. 12-13). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a well known form of hydroxygallium phthalocyanine in the invention of Yuh because the reference suggests the use of hydroxygallium phthalocyanine and the artisan would look to those forms of the phthalocyanine known to be effective in photognerating layers.

Claims 1-9, 14-20, 24, 25, 27-29, 31, and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tokutake *et al.* in US Patent Application Publication 2003/0087171 in view of Mori in US Patent 5,567,557 and further in view of *Handbook of Imaging Materials*. Diamond, Arthur S & David Weiss (eds.) pp. 145-164.

Tokutake discloses an organic photoreceptor comprising a conductive support, a titanium oxide-containing subbing layer of 2 micron thickness (also see ¶ [0012]), a charge generation layer comprising titanyl phthalocyanine and a butyral resin of 0.2 micron thickness, a

first charge transport layer of 20 micron thickness comprising a styrene acrylate binder resin, a 2,6-di-tert-butyl-4-methylphenol antioxidant and an aryl amine charge transport compound, and a second charge transport layer of 6 micron thickness containing the same charge transport material and an antioxidant with a different binder resin and a silicone oil (¶ [0026]; Example 1). More generally, the second charge transport layer as having a thickness of 3 to 15 microns (¶ [0063]), and the amount of the antioxidant is from 0.5 to 30 weight percent (¶ [0059]). In addition, the reference discloses various useful resins for the first charge transport layer, such as bisphenol A-type (see instant claim 3) and bisphenol Z-type polycarbonates and polystyrenes (¶¶ [0020], [0026]). Diaryl amines and benzidines are useful charge transport materials for each layer (¶¶ [0021]] & [0057]). The amount of the charge transport material is 40 to 280 parts by weight per 100 parts of the binder resin in the first charge transport layer (¶ [0021]). The second transport layer contains a denatured polycarbonate resin having units such as (II-1), such as in polymer (IV-2) (pp. 8-9). This resin may be mixed with a styrene resin to form the binder resin (¶ [0062]). The charge generation layer contain a binder resin such as a polycarbonate (¶ [0014]).

Tokutake does not disclose the hindered phenol antioxidant of the instant claims for the second charge transport layer, but Mori discloses an electrophotgraphic photoreceptor which comprises; a conductive substrate, an intermediate layer on the conductive substrate, a photosensitive bilayer of an organic material on the intermediate layer, the photosensitive bilayer includes a charge generation layer and a charge transport layer, the charge generation layer being deposited on the intermediate layer, the charge transport layer being deposited on the charge generation layer, the charge transport layer being an outermost layer of the photosensitive bilayer, and the charge transport layer contains an ester phosphite antioxidant and a hindered phenol antioxidant (col. 4, l. 1-12). The exemplified hindered phenol antioxidant

is given by the formula 4-1 or 4-5 (col. 12). The antioxidant is present in an amount of from 0.01 to 10 weight percent (col. 13, l. 20-24; Table 1). The combination of antioxidants in the charge transport layer permits the artisan to control degradation of the photoreceptor from active gasses, such as ozone, during the copying process.

Diamond reviews the basic steps of the electrophotographic copying process. This process includes a charging step (§ 4.2.1), which Diamond identifies as producing nitrogen oxides and ozone as byproducts, which have deleterious effects on the photoreceptor.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add an ester phosphite antioxidant and a hindered phenol antioxidant to the second charge transport layer of Tokutake because these compounds reduce the deleterious effects of ozone and other gaseous by-products formed during the photoreceptor charging process, as noted by Diamond. The artisan would have found it obvious to optimize the amounts of the antioxidants in order to minimize the deleterious effects of ozone during charging.

Double Patenting

Applicant is advised that should claims 2 and 3 be found allowable, claims 4 and 5, respectively, will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher RoDee whose telephone number is 571-272-1388. The examiner can normally be reached on most weekdays from 6:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cdr
22 November 2005

CHRISTOPHER RODEE
PRIMARY EXAMINER